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Stated Meeting, February 19.

Present, thirty-two members.

Mr. Du Ponceau, President, in the Chair.

Letters were read—

From the Secretary of the London Society of Antiquaries, dated 20 Nov., 1840, acknowledging the receipt of Vol. VII. Part 1, of the Transactions, and of Nos. 11 and 12 of the Proceedings of this Society.

From His Excellency, the French Minister, M. de Bacourt, dated Washington, 29 Jan., 1841, presenting to the Society a copy of the new edition of the Dictionary of the French Academy.

From Mr. William B. Wood, of Philadelphia, dated 17 Feb., 1841, presenting to the Society a volume of the Canton Register, edited by his son, Mr. Wm. W. Wood, the first newspaper printed in the Empire of China in the English language.

From Mr. David B. Warden, dated Paris, 22 Dec., 1840, in relation to certain works ordered by him for the Society.

The following additions to the Library were announced:—

BY DONATION.

Transactions of the Horticultural Society of London. Second series. Vol. II. Part 5. 4to.—***From the Society.***

Philosophical Transactions of the Royal Society of London, for the year 1840. Part 2. 4to.—***From the Society.***

Proceedings of the Royal Society. Nos. 41 to 44 inclusive, 1839–1840. 8vo.—***From the same.***

Proceedings of the Horticultural Society of London. Nos. 7 and 8. ***From the Society.***

List of the Horticultural Society of London, corrected to 12 August, 1840.—***From the same.***

Proceedings of the Numismatic Society of London. 1838–39.—***From the Society.***

Dictionnaire de l'Académie Française. Sixième Édition. 2 Vols. 4to. Paris, 1835.—***From H. E. Ad. de Bacourt, Minister Plenipotentiary of France.***

Congressional Documents. 26th Congress, 2d Session. Doc. No. 2. 8vo. Dec., 1840.—***From Hon. G. W. Toland.***

The American Medical Library and Intelligencer. Vol. 4, No. 19. Jan., 1841. By Robley Dunglison M.D. &c. &c.—*From the Editor.*

Institut Royal de France. Rapport des Séances Publiques Annuelles des Cinq Académies. Mai, Juin, Juilliet, 1840. 7 Nos. 4to.—*From Mr. Warden.*

History of the Federal Government, for Fifty Years, from March 1789, to March 1839. By Alden Bradford, LL.D. &c. 8vo. Boston, 1840.—*From the Author.*

Historical View of the Literature of the South of Europe, by J. C. L. Simonde de Sismondi, &c., Translated from the Original, with Notes, by Thomas Roscoe, Esq. 2 Vols. 8vo. New York, 1827.—*From Mr. Vaughan.*

The Canton Register, Canton, Nov. 8, 1827, to Dec. 13, 1828 inclusive. Fol.—*From Mr. William B. Wood.*

BY PURCHASE AND EXCHANGE.

The Edinburgh New Philosophical Journal, conducted by Professor Jameson. Oct., 1840 to Jan., 1841, inclusive. 8vo.

The London and Edinburgh Philosophical Magazine and Journal of Science, by Sir David Brewster, Richard Taylor, and Richard Phillips. 3d Series, No. 101. Feb., 1840. 8vo.

The Magazine of Natural History, and Journal of Zoology, &c. &c. conducted by J. C. Loudon. No. 1, May, 1828. No. 6, March, 1829. No. 13, May, 1830. No. 17, Jan., 1831. No. 25, April, 1832. No. 26, May, 1832. No. 27, June, 1832. No. 30, Nov., 1832. No. 42, Oct., 1834. 8vo.

The Nautical Almanac and Astronomical Ephemeris, for 1843. 8vo.

Journal Asiatique, ou Recueil de Mémoires, &c. 3me Sér. Tome 10. No. 53, Juillet, 1840. No. 54, Août 1840. 8vo.

Journal Général de la Littérature de France. 43me ann. Cah. 7, 8. Juillet, Août. 8vo.

Annales de Chimie et de Physique. Mar., Avr., Mai, Juin, Juill., Août, Sept., 1840. 8vo.

Comptes rendus hebdomadaires des séances de l'Académie des Sciences, &c. 1r Sem., 1840, Nos. 2 to 26 inclusive, and 2me Sem., Nos. 1 to 17 inclusive. 4to.

The Committee, consisting of Mr. Nulty, Dr. Patterson, and Professor Vethake, to whom Mr. Walker's paper, entitled, "Researches concerning the Periodical Meteors of August and

November," had been referred, reported in favour of its publication in the Transactions; which was thereupon ordered.

The paper contains—1st, Tabular statements of the relative velocities derived from corresponding observations of the same meteor at different stations, chiefly from Quetelet's Catalogue. 2d. A catalogue of remarkable appearances of shooting stars, also from Quetelet, with additions. 3d. Bessel's position of the earth, in the ecliptic at the date of the principal November showers. 4th. The convergent points hitherto observed for the relative paths of the meteors of August, and—5th. Of those of November. The term *periodical* is restricted to the meteors, which, at a particular season of the year, tend towards the convergent point for that season. *Sporadic* is applied to the unconformable meteors seen on the same occasions. *Extraordinary* showers of the second table are placed in the former class, and are considered as differing from periodical meteors only in numbers. The convergent point, as far as noticed for the periodical meteors, is not far from the antipode of the earth's *tangential* direction. The average relative velocities in table first, with the known convergent points, for August and November, and other parts of the year, as far as observed, afford on the cosmical theory, the most plausible estimate of the elliptic elements of the orbit of periodical meteors. The well-known formulæ for computing these elements are stated; and the differential formulæ are investigated for computing the probable errors of such elements, arising from errors of the relative velocities and directions derived from the foregoing tables. The most plausible elements of the periodical meteors, are thus found to have their perihelia inferior to that of Mercury, and hence are only seen by us when near their aphelia; the orbits being necessarily very eccentric, or flattened, and their inclinations very great. Since many millions of these bodies are annually encountered by the earth, including chiefly those which move in orbits having small parameters, analogy leads to the inference, that the planetary spaces inferior to Venus, abound in these bodies, of which only a small proportion ever reach the earth's mean distance, or become visible to us. This suggestion of a far greater aggregation of these bodies near the sun, is supported by the analogy of the resisting medium encountered by Encke's comet, which is only sensible at a distance from the sun below that of Venus. Bessel's objections to the theory of the resisting medium, that it is indicated by no other phenomenon in nature, may be in some degree obviated by this analogy; since a very thin, light body, might be sensibly resisted by a great multitude of these small meteors or asteroids, though their effect is insensible on Mercury and the other primaries, owing to their superior mass and density, and as Encke remarks, also insensible on Halley's and Biela's comets, whose perihelion distances, respectively, correspond nearly with those of Venus and the earth. It is only necessary to suppose that in some planes these bodies exhibit a greater tendency to the formation of clusters, or possibly of flattened rings, in order to account for anniversary periods of remarkable showers; since the earth revisiting the same plane at the same season of the year, and at the same distance from the sun, may or may not encounter one of these clusters or parts of a flattened ring. But these clusters continuing to move in the same plane, the earth must, if it meet them at all, do so at anniversary periods. On the supposition of a flattened ring, the node having the same radius vector as the earth, these displays might occur for several anniversaries, and then cease for an indefinite period, owing to the motion of the apsides of the ring; till the anomaly which has a radius vector equal to the earth's mean distance, again coincides with one of the nodes of the ring. Hence the connexion between the periods of the second table, as far as regards our knowledge of them is *accidental*, since they depend not on the orbital period of these bodies round the sun, but on the circumstance of the earth's encountering one of these clusters, or planes abounding in them, which is regulated by a law of distribution of these bodies in planetary space, that must always remain unknown, for want of data for its determination.

The author conjectures that the meteors termed *sporadic*, by Quetelet, which have no common convergent point, may have their perihelia superior to those of the periodical meteors, and their aphelia far superior to that of the earth. In such a case, their orbital velocity would be as great as that of the earth, or greater; and as they move in all varieties of direction, the earth's tangential motion does not cause them to tend, relatively towards a convergent point, in nearly an opposite direction, as it does with meteors moving very slowly in their orbits, whatever may be their true directions in space.

A brief history of the opinions and theories of writers on this subject is given; and an oversight pointed out in Professor Erman's paper, quoted by the author in an oral communication of August 21st, 1840. This relates to Prof. Erman's minimum relative velocity of the meteors, which, instead of being 0.83, of that of the earth, may be indefinitely small, and therefore, in his formulæ [Astronomische Nachrichten, No. 385, p. 9,] may give a motion of the convergent point indefinitely great. The author also remarks, that the quantities neglected in Prof. Erman's formulæ for this motion, may produce an important effect on the result, and even change its direction from a retrograde motion, as found by Prof. Erman, to a direct motion as observed by Mr. Fitch, at New Haven, and as indicated by Prof. Forshey's observed positions of this point at two different dates on the night of 10th August last. A slight anachronism is also mentioned in Mr. Walker's oral communication, Mr. Herrick having called the attention of observers to the August period, *after* the display of 1837, instead of *before*; Mr. H. having made no observations that year himself, but having reported the convergent as observed about 30 degrees from the pole in the Camelopard, by Mr. Shaeffer, of New York.

The same committee, to whom had been referred a communication from Professor Pierce, of Cambridge, Mass., containing remarks on Mr. Erman's discussion of the orbits of the periodical meteors, and an investigation of their perturbations, reported in favour of publishing the communication in the Transactions; and its publication was thereupon ordered.

The paper has reference to the earth's attractive force in increasing the relative velocity of a meteor approaching near its surface. The formulæ employed are those of the Méc. Cél., Vol. IV., Book 9, Chap. 2; the meteor being at the time within the earth's sphere of activity, the radius of which is 0.0053 in units of the earth's mean distance, the actual radius vector being 0.0057, for the date in question, August 10th, 1839. The notation is that of Prof. Erman, Jr., in Schumacher's Astr. Nachr., No. 385. If v'^2 denote the meteor's relative velocity in its elliptic orbit round the sun, according to the cosmical theory adopted by Professor Erman, then according to Professor Pierce, the square of the actual relative velocity increased by the earth's attraction is, $v_{,}'^2 = v'^2 + 0.13932$, in units of the earth's true tangential velocity. Professor Erman, having comprised within certain limits the possible true and relative velocities of the meteors, from the sun's central force; these, together with the increased relative velocity, are thus pointed out. The author, however, states, that Prof. Erman's minimum limit of the relative velocity is adopted on insufficient ground, owing to the rejection of one of the two roots of an equation of the second degree, where both roots are possible. A similar remark is applied to Prof. Erman's limits for the inclinations and other elements of the meteor's orbits. The author then gives the reasons which tend to show that the actual relative velocity is below Prof. Erman's minimum limit. Thus, in the instance of the meteors of August 10th, the average discrepancy of any single meteor's relative direction, from the common convergent point, is, according to Prof. Erman, more than 10°, and must have a maximum of not less than 25°. The Professor remarks, that this discrepancy may arise

1. From difference of their elliptic orbit round the sun.
2. From their mutual action.
3. From the earth's attraction.

The first and second causes, on Prof. Erman's hypothesis of an elliptic ring, could not produce a discrepancy of more than 2° or 3°. In order that one of 10° should result from the third cause, it would be necessary that the relative velocity should be less than one third of that of the earth, in which case the orbits of the meteors would be inclined less than 14°, to the ecliptic. The author concludes, that a ring so near the earth, must be subject to very great perturbations, and if there is one, he thinks that no observations which we can make will enable us to calculate its motions with any degree of accuracy.

Dr. Ludlow and Dr. Mitchell presented a report from the committee, to whom had been referred Professor Tucker's paper, entitled "Psychological Observations on the Siamese twins, Cheng and Eng, made in 1836."

Soon after the arrival of the Siamese twins into the United States, now above eleven years ago, it appeared to me, says Prof. Tucker, that they afforded an opportunity of making some psychological observations which had never before been presented, unless perchance by some like freak of nature.

Here were two individuals who were precisely similar in all the circumstances likely to influence either their bodies or minds. They had always breathed the same air, eaten of the same food at the same time, slept and waked together, and taken the same exercises both in kind and quantity, and at the same moment. Whatever had affected the senses of the one, had affected those of the other. Their sources of knowledge, whether from observation or reasoning, and their lessons both of experience and education, were precisely the same. They had also been sick and well together, and may be supposed to have had in all respects, the same pleasures and pains, bodily and mental.

Placed in circumstances so similar, or rather identical, these twins suggested the inquiry whether there was a correspondent resemblance in their faculties, passions and propensities; or if there was a diversity what was its nature and extent; and the result of the investigation seemed likely to shed no little light on the several theories, which have been put forth to explain the diversities of genius and mental character.

It is known that some maintain with Helvetius, that these diversities among men whose organs have the ordinary degree of soundness, are the result of the particular circumstances in which the different individuals chance to be placed, while others insist that the cause of such diversities is to be attributed mainly to a difference of organization. Of this opinion was Dr. Gall, who further maintained that the mental faculties and propensities of each individual were indicated by small protuberances at the surface of the brain, and that these might be discovered by means of correspondent protuberances on the skull. There is a third class comprehending a much larger number both of vulgar and philosophic minds, who think that our intellectual character depends partly on nature and partly on cultivation, and who would apply to mental excellence of every kind, what Horace says of poetical genius:

—— ego nec studium sine divite venâ,
Nec rude quid prosit video ingenium, alterius sic
Altera poscit opem res et conjurat amice.

Now, if it should be found, on a careful comparison of the two brothers, that notwithstanding they had been placed in precisely similar circumstances, there was a marked difference in their faculties and tastes, they would seem to afford a satisfactory refutation of the doctrine of Helvetius. Should, however, no difference be discovered in their mental powers and propensities, then indeed, we should not be able to decide whether this close resemblance was to be attributed to the identity of circumstances in which they had been placed, or to that similarity of organization which is often seen in twins, and which nothing since their birth could, in this case, have disturbed.

To compare the minds of two persons whom we had so much reason to expect would think and feel alike, it occurred to me that the most eligible plan would be to propound the same questions at the same time to both, to take the answers of each, without the privity of the other, and that their answers thus obtained would enable us to decide whether there was any material difference in their tastes, faculties, and susceptibilities.

The first opportunity* which presented itself to me, of making the comparison, was in the city of New York, in the summer of 1836, I think, when I proposed the examination to them, through their conductor, Mr. Hale; and he having obligingly seconded my purpose, they also, after being satisfied about my motives, consented to submit to it.

The examination took place in the afternoon, in one of the rooms of the Clinton Hotel, and was thus conducted: a number of questions previously prepared, were propounded by Mr. Hale to Eng, and by me to Cheng. Their answers to each question, communicated to us in a whisper, were written down by us before we proceeded to another question. Some of the prepared questions, by the advice of Mr. Hale, were not asked, and one or two of their answers, in which they had indulged in personalities that might offend, were at their instance suppressed; with these exceptions, the questions and answers subjoined are to the letter as they were given.

Question 1. What part of America puts you most in mind of Siam?

Cheng. New Orleans.

Eng. Louisiana.

2. Where did you stay longest in England?

Both. In Glasgow.

3. Whom did you see first in London?

Cheng. I did not know him.

Eng. Charles something, but I can't recollect the whole name.

4. Have you been sick in this country? How long ill?

Cheng. Yes, twice, once fourteen days.

Eng. Yes, in New York, with a head-ache, and in Ohio with fever and ague.

By way of comparing their associating faculties, several words were then mentioned to them, and they were asked what these words suggested to their minds. Thus,

5. What does the word *London* suggest?

Cheng. What a dark place it is. They went about in the day by torch-light.†

Eng. St. Paul's.

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* I had indeed seen them some time before, in the neighbouring village of Charlottesville, but they were too impatient to proceed on their journey to allow of the examination then.

† The Siamese youths reached London in November, when its fogs are most dense.

6. What, Liverpool, Boston?*

Cheng. Boston much the handsomest city.

Eng. Liverpool is much the dirtiest.

7. What, manufactures?

Cheng. The manufactures in Leeds.

Eng. They suggest the idea of the ingenuity of man.

8. What, war?

Cheng. The battle of New Orleans.

Eng. Very bad article to deal with: I think folks could get along better without it.

9. What, money?

Cheng. A mighty good thing.

Eng. Very good I think—quite opposite to war.

10. Whom of all our great men do you most admire?

Cheng. General Washington, John C. Calhoun.†

Eng. John C. Calhoun.

11. How large does the sun appear to you?

Cheng. As big as this room.

Eng. Not bigger than a decent sized centre table.

12. Are you willing to settle in America?

Cheng. I think not.

Eng. No.

13. What do you regard as the most useful invention?

Cheng. A ship.

Eng. Ship building.

14. What kind of animal food do you like best?

Cheng. Ducks, geese and roast beef.

Eng. Big goose.

15. What kind of vegetable food?

Cheng. No particular preference.

Eng. No choice—not being partial to any.

16. What kind of fruit?

Cheng. Peaches, pears, melons.

Eng. Musk melons.

17. What kind of perfume?

Both. Rose.

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* These cities were intended to be the subjects of separate questions, but being by mistake conjoined in questioning one brother, they were put in the same way to the other.

† Their political predilections were then decidedly with the whigs, as the suppressed answers showed.

18. What colour do you like best?

Cheng. That depends upon what the thing is.

Eng. That depends upon whether for coach, person, handkerchief, or coat.

19. What colour do you like best in flowers?

There was a large vase in the room filled with flowers in great variety, and they both pointed to those that were of a saffron colour.*

20. What season of the year do you prefer?

Cheng. The spring.

Eng. The fall of the year.

21. What kind of music do you like best?

Both. The piano—the hunter's chorus.

22. What objects do you consider the handsomest, as possessing the greatest beauty?

Cheng. I could not answer that: I see so many.

Eng. Handsome women.

It will be perceived that none of the preceding questions were framed, with the view of comparing the powers of ratiocination of the twins. But, besides that the preparation of such questions would have required more time and care than I could then command, it was easy to see that our course of inquiry, however interesting to me, was becoming tiresome to them; nor am I sure that the very comparison I proposed to make did not give some shock to the feelings of pleasure with which they regard their *consentaneousness* on almost all subjects, whether of opinion or taste.

This general accordance in sentiment, which might have been inferred, was confirmed by Mr. Hale. It appeared from his answers to my inquiries, that they differed in opinion but seldom, and only on such occasions as those in which an individual may in a short time differ from himself, or experience a change of purpose; and the case he instanced was the time when they should leave a place—one thinking it better to quit on one day, and the other on another. But the difference never led to disputation. With these rare exceptions, there was an entire concurrence in their wishes, not merely from the similarity of their tastes and desires, but also from the unwillingness felt by each to contravene the desires or purposes of the other: as a proof of this, he stated that they sometimes amused themselves with chess, but on these occasions they did not, as other persons, play one against the other, but both of them played on both sides. As no human beings have their sympathies so frequently appealed to, or in such constant exercise, they must be peculiarly strong in both. These brothers thus furnish the most perfect example of disinterested friendship that has ever existed, and they exhibit a phenomenon of moral beauty that is singularly pleasing.

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* As the dress of the Siamese priesthood must always be yellow, and the telapoins, or priests, constitute the most honourable class, it is probable that this preference for yellow may be ascribed to associations growing out of the customs of their country, especially as *red* seems to be the colour which is preferred by all civilized nations, whatever may be their natural complexion.

Mr. Hale further stated, that Cheng was the most quick tempered of the two, to which they both assented. He is also a trifle the taller and the stronger, and *may* have the most energy of purpose. If so, the habitual exercise of his will in directing their actions, may insensibly give to him a greater desire of command, and to his brother a greater willingness to submit to it. But this exertion of authority would not be likely to pass beyond a certain point, as it would meet with a ready counteraction in the sympathetic feelings referred to. As each is to each almost another self, neither can take much pleasure in that which does not please the other, and while this extraordinary degree of fellow-feeling is not incompatible with the exertion of as much authority on the part of one brother, as the other may willingly submit to, it is inconsistent with a surrender of that other's decided wishes and desires.

But, on the other hand, the greater energy of will and of purpose, which has been supposed, may not exist, or if it does, it may be balanced by the greater powers of reflection possessed by Eng. Though the questions here propounded are too few to warrant any confident conclusions, we cannot but perceive that nearly half of his answers exhibit somewhat more of thought, or of precision than the answers of his brother. If this be a just inference, it affords persuasive evidence against the theory of Helvetius. How far these twins may support or refute the principles of phrenology, I did not inquire; not only because an examination of their heads, before their mental characters were accurately compared, would be premature, but also because it would be more satisfactory if made by those whose minds are more undecided about the merits of Gall's system than mine can pretend to be.

In conclusion, the author remarks, that his memoir was written not so much on account of the success of the experiment it details, as by way of suggesting its repetition to some other inquirer, under more favourable circumstances Such a one would have the advantage of the greater strength which the peculiarities of these twins may be supposed to have received from time and indulgence: he might propound to them a greater number of questions, prepared with more care; he might compare not merely a part of their mental faculties and propensities, but all of them; and lastly, he might ascertain whether the further development and growth of their passions have cast a shade over the interesting moral picture they once presented, of a singleness of purposes and desires in two individuals of the same sex.

The Committee, in their report, express the hope that the author of the paper or some other scientific individual may be induced to continue these interesting psychological inquiries.

Mr. Lea read a continuation of his paper on fresh water and land shells, which was referred to a committee.

Dr. Mitchell stated, that Dr. Hare and himself were engaged in the examination of the electrical effects of the escape of liquid carbonic acid. It is known, that on being liberated from pressure, this liquid is partially converted into gas, with the consequent production of so much coldness as to convert the remainder into a solid. On directing the jet from the receiver upon a metal disc, seated on the cap of a gold leaf electrometer, the leaves diverged, and on holding, by means of a glass handle, another metal plate to the jet, Dr. Hare perceived electrical sparks passing from the disc to his hand.

Dr. Mitchell concluded by observing, that the phenomena that might be presented on a further investigation would be reported at the next sitting of the Society.

Mr. Lea, as chairman of the Committee of Publication, laid before the Society a copy of Part 2, Vol. VII., of the Transactions.